



# Spectral Gamma-Ray Borehole Log Data Report

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Borehole

# 40-05-08

Log Event A

## Borehole Information

Farm : <u>S</u>	Tank : <u>S-105</u>	Site Number : <u>299-W23-199</u>
N-Coord : <u>36,111</u>	W-Coord : <u>75,819</u>	TOC Elevation : <u>663.00</u>
Water Level, ft :	Date Drilled : <u>3/31/1976</u>	

## Casing Record

Type : <u>Steel-welded</u>	Thickness : <u>0.280</u>	ID, in. : <u>6</u>
Top Depth, ft. : <u>0</u>	Bottom Depth, ft. : <u>100</u>	

## Borehole Notes:

This borehole was drilled in March 1976 to a depth of 105 ft. The borehole was started with a 20-ft length of 8-in. surface casing and was completed to a nominal depth of 100 ft using 6-in.-diameter casing. The open borehole below the bottom of the casing was filled with grout. The 20-ft length of surface casing was then removed and the annulus between the 6-in. casing and the portion of the borehole wall drilled with the 8-in. casing was grouted.

The thickness of the permanent casing wall is assumed to be 0.280 in., on the basis of the published thickness for schedule-40, 6-in. steel tubing. The top of the casing, which is the zero reference for the SGLS logs, is approximately even with the tank farm grade.

## Equipment Information

Logging System : <u>2</u>	Detector Type : <u>HPGe</u>	Detector Efficiency: <u>35.0 %</u>
Calibration Date : <u>05/1996</u>	Calibration Reference : <u>GJPO-HAN-5</u>	Logging Procedure : <u>P-GJPO-1783</u>

## Log Run Information

Log Run Number : <u>1</u>	Log Run Date : <u>06/14/1996</u>	Logging Engineer: <u>Alan Pearson</u>
Start Depth, ft.: <u>98.5</u>	Counting Time, sec.: <u>100</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>13.0</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>
Log Run Number : <u>2</u>	Log Run Date : <u>06/17/1996</u>	Logging Engineer: <u>Alan Pearson</u>
Start Depth, ft.: <u>0.0</u>	Counting Time, sec.: <u>100</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>14.0</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>
Log Run Number : <u>3</u>	Log Run Date : <u>06/17/1996</u>	Logging Engineer: <u>Alan Pearson</u>
Start Depth, ft.: <u>70.0</u>	Counting Time, sec.: <u>100</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>55.0</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>



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## Analysis Information

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Analyst : H.D. Mac Lean

Data Processing Reference : P-GJPO-1787

Analysis Date : 03/20/1997

### Analysis Notes :

This borehole was logged by the SGLS in three logging runs. Two logging runs were required to log the length of the borehole. A third log run was performed as an additional quality assurance check of a segment of one of the primary log runs.

The pre- and post-survey field verification spectra for each log run met the acceptance criteria established for peak shape and system efficiency. The energy and peak-shape calibration from the post-survey field verification spectra were used to establish the channel-to-energy parameters used in processing the spectra acquired during the logging runs. There was negligible gain drift during the logging runs and it was not necessary to adjust the established channel-to-energy parameters during processing of log data to maintain proper peak identification.

Casing correction factors for a 0.280-in.-thick casing were applied during the analysis.

Cs-137 was the only man-made radionuclide detected in this borehole. Cs-137 contamination was detected continuously from the ground surface to 1.5 ft and almost continuously from 9.5 to 12 ft. The measured Cs-137 concentrations inside the borehole were less than 1 pCi/g and generally slightly above the MDL. The maximum Cs-137 concentration was about 2 pCi/g at the ground surface. However, this is not an accurate concentration value because the source-to-detector geometry at the top of the borehole casing differs from source-to-detector geometry used in the calibration.

The KUT log plots show a region of relatively low K-40 concentration values between the ground surface and 20 ft. The normal K-40 background concentration of about 10 pCi/g was reduced to about 7 pCi/g between the ground surface and a depth of 20 ft. Peaks are shown on the K-40 plot at about 50.5 and 58 ft. Below about 63 ft, the K-40 and Th-232 concentration values increase significantly and the U-238 concentrations increase slightly.

Details concerning the interpretation of data for this borehole are presented in the Tank Summary Data Reports for tanks S-105 and S-106.

### Log Plot Notes:

Separate log plots show the man-made and the naturally occurring radionuclides. The naturally occurring radionuclides can be used for lithology interpretations. The headings of the plots identify the specific gamma-rays used to calculate concentrations.

Uncertainty bars on the plots show the statistical uncertainties for the measurements as 95-percent confidence intervals. Open circles on the plots give the MDL. The MDL of a radionuclide represents the lowest concentration at which positive identification of a gamma-ray peak is statistically defensible.

A combination plot includes both the man-made and naturally occurring radionuclides, the total-count log plot, and the Tank Farm gross-gamma log. The Tank Farm gross-gamma plot displays the latest available digital data. No attempt has been made to adjust the depths of the gross gamma log plot to coincide with the SGLS



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data.

A separate plot of the interval between depths of 55 and 70 ft that was relogged as a quality assurance check shows the repeatability of the radionuclide concentration measurements. The radionuclide concentrations shown were calculated using the separate data sets provided by the original and rerun logging runs.